

# PHYSICS COLLOQUIUM

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## **Towards precision accelerator-based neutrino beams**

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The Deep Underground Neutrino Experiment (DUNE) is an experiment under construction that will include large neutrino detectors in both Illinois and South Dakota. It has a wide array of physics goals including probing the origin of neutrino mass, searching for proton decay, and observing neutrinos from Supernovae. DUNE will receive neutrinos from the Long Baseline Neutrino Facility (LBNF), an accelerator-based neutrino beam of unprecedented intensity. Recent advances in computing power coupled with the development of complex optimization algorithms enabled the LBNF beamline to be precisely optimized to meet DUNE's physics goals. This talk will introduce LBNF and DUNE and discuss this optimization, as well as other challenges associated with creating and using a beam of invisible particles.